

H76 ANT. Coupler Ac-2

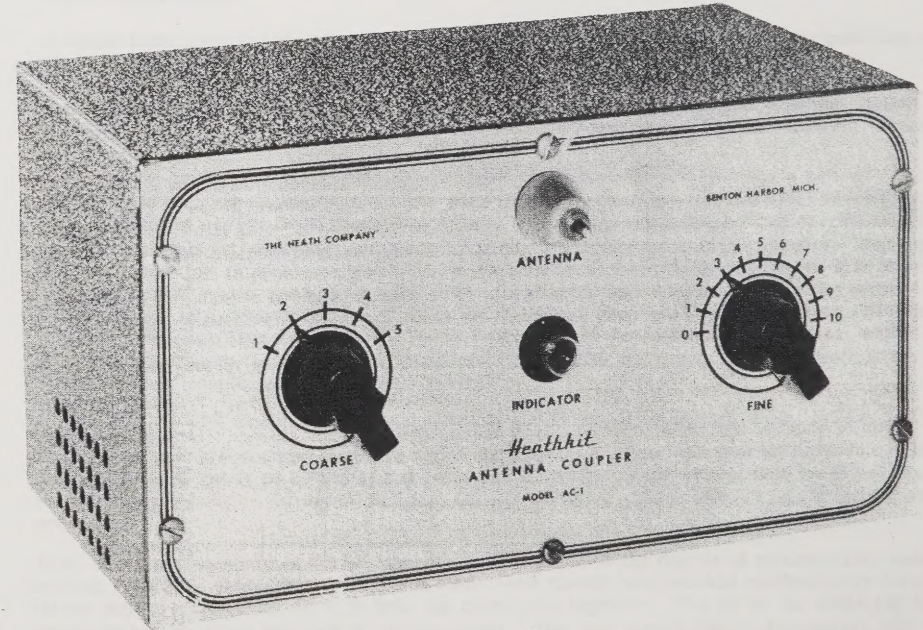
STANDARD COLOR CODE — RESISTORS AND CAPACITORS

AXIAL LEAD RESISTOR 	INSULATED UNINSULATED Color BLACK BROWN RED ORANGE YELLOW GREEN BLUE VIOLET GRAY WHITE	FIRST RING BODY COLOR First Figure 0 1 2 3 4 5 6 7 8 9	SECOND RING END COLOR Second Figure 0 1 2 3 4 5 6 7 8 9	THIRD RING DOT COLOR Multiplier None 0 00 ,000 0,000 00,000 000,000 0,000,000 00,000,000	DISC CERAMIC RMA CODE
RADIAL LEAD DOT RESISTOR 	5-DOT RADIAL LEAD CERAMIC CAPACITOR 	EXTENDED RANGE TC CERAMIC HICAP 	RADIAL LEAD (BAND) RESISTOR 	BY-PASS COUPLING CERAMIC CAPACITOR 	AXIAL LEAD CERAMIC CAPACITOR

The standard color code provides all necessary information required to properly identify color coded resistors and capacitors. Refer to the color code for numerical values and the zeroes or multipliers assigned to the colors used. A fourth color band on resistors determines tolerance rating as follows: Gold = 5%, silver = 10%. Absence of the fourth band indicates a 20% tolerance rating.

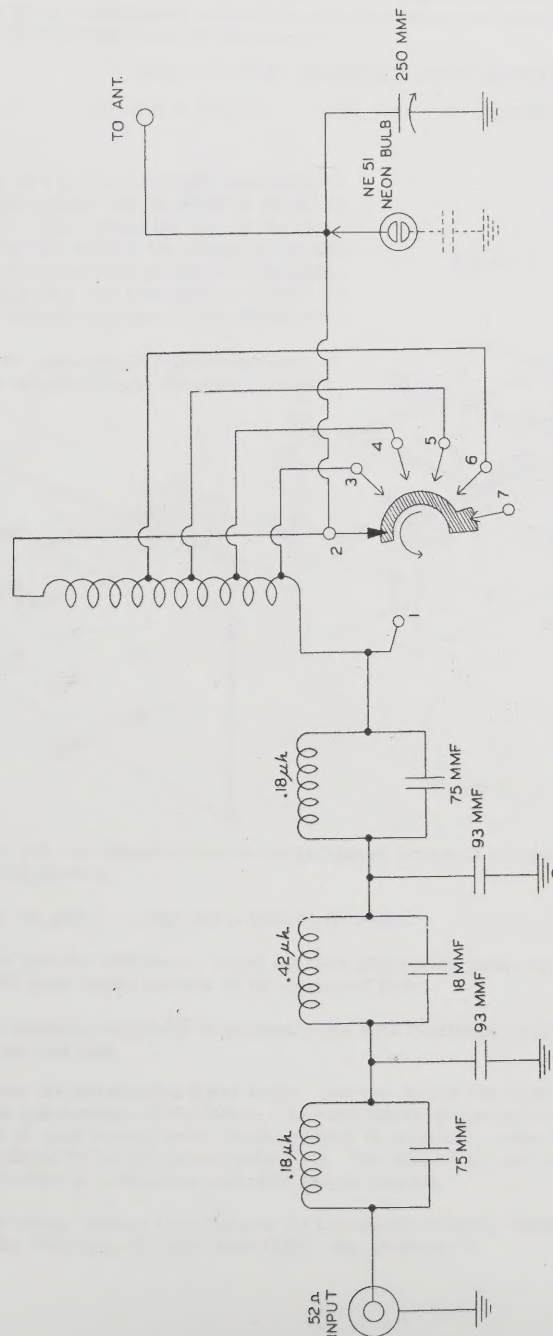
The physical size of carbon resistors is determined by their wattage rating. Carbon resistors most commonly used in Heath-kits are 1/2 watt. Higher wattage rated resistors when specified are progressively larger in physical size. Small wire wound resistors 1/2 watt, 1 or 2 watt may be color coded but the first band will be double width.

ASSEMBLY AND OPERATION OF THE HEATHKIT ANTENNA COUPLER MODEL AC-1



SPECIFICATIONS

Maximum RF Power Input.....	75 watt
Input Connection.....	52 ohm coaxial cable
Output Connection.....	Single-ended
Low Pass Filter Cut-off Frequency.....	36 megacycles
Dimensions.....	7 1/8" x 4 3/8" x 4 7/8"
Net Weight.....	2 lbs.
Shipping Weight.....	3 lbs.



SCHEMATIC ANTENNA COUPLER

INTRODUCTION

The Heathkit model AC-1 Antenna Coupler was designed to operate with the Heathkit model AT-1 Transmitter. However, it will perform equally well with any transmitter that has an input power not exceeding 100 watts and an output impedance of 52 ohms. It provides an effective means of matching the transmitter to a simple end fed antenna, and incorporates a low pass filter for harmonic attenuation. A random length of wire approximately 75 feet or more can be operated on the amateur bands of 10 through 80 meters by the use of this coupler. Rugged design, simple layout and quality components assure ease of construction and reliability of operation.

CIRCUIT DESCRIPTION

A coaxial receptacle on the rear of the chassis connects to a three section Pi type low pass filter. The chassis forms the shielded compartments for the filter sections. Low inductance feed-thru capacitors provide necessary capacitance to ground, yet preserves the shielding between filter sections.

A tapped inductance and variable capacitance are used in an L section impedance matching unit. The combination thus afforded will match a wide range of antenna impedances.

The neon indicator lamp is capacity coupled between the output terminal and the cabinet. It serves as a tuning indicator and also may be used as a rough approximation of power output.

NOTES ON ASSEMBLY AND WIRING


The construction and alignment of the low pass filter is normally a very critical procedure. In your Heathkit AC-1, the tuned circuits have been factory pre-adjusted, so that no trouble should be experienced in the assembly and operation of this portion of the Antenna Coupler. We suggest that you take a few minutes now and read the entire manual through before any work is started. This will enable you to proceed with the work much faster and with less chance for error. The large fold-in pictorial is handy to attach to the wall above your work space. Its use will greatly simplify the construction of the kit. These diagrams are repeated in smaller form within the manual. We suggest that you retain the manual in your files for future reference both in the use of the Antenna Coupler and for its maintenance.

UNPACK THE KIT CAREFULLY AND CHECK EACH PART AGAINST THE PARTS LIST.

In so doing, you will become acquainted with each part. If some shortage is found in checking the parts, please notify us promptly and return the inspection slips with your letter to us. Hardware items are counted by weight and if a few are missing, please obtain them locally if at all possible.

Much of the performance of the kit instrument depends upon the degree of workmanship used in making soldered connections. The connection itself should be clean and mechanically strong. Do not depend upon solder alone to hold the connection together. The tip of the soldering iron should be bright, clean and free of excess solder. Use just enough heat to thoroughly flow the solder smoothly into the joint. Excessive heat may damage components. Use no more solder than necessary for a good electrical connection. More than this makes for poor appearance and the excess flux may cause leakage over adjacent insulation. Crimp all leads tightly to the terminals before soldering. Be sure both the lead and the terminal are free of wax, corrosion or other foreign substances. Use only the best rosin core solder, preferably a type containing the new activated fluxes such as Kester "Resin-Five," Ersin "Multicore," or similar types.

NOTE: ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE INSTRUMENTS IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. WHEN IN DOUBT ABOUT SOLDER, IT IS RECOMMENDED THAT A NEW ROLL PLAINLY MARKED "ROSIN CORE RADIO SOLDER" BE PURCHASED.



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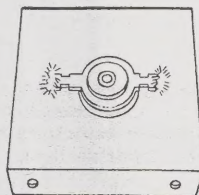
We strongly urge that you follow the wiring and parts layout shown in this manual. The position of wires and parts is extremely critical in radio frequency instruments and changes may seriously effect the characteristics of the circuit.

STEP-BY-STEP ASSEMBLY INSTRUCTION

(S) means solder. (NS) means do not solder yet.

- (X) Solder a 93 μf feed through condenser to the copper-plated shield plate as shown in Figure 1. The condenser should be centered over the hole in the shield plate and the two condenser tabs soldered to the plate. This requires a hot iron and care must be taken to prevent damage to the condenser.

Figure 1



- (X) Solder the remaining 93 μf condenser to the other shield plate in the same manner.

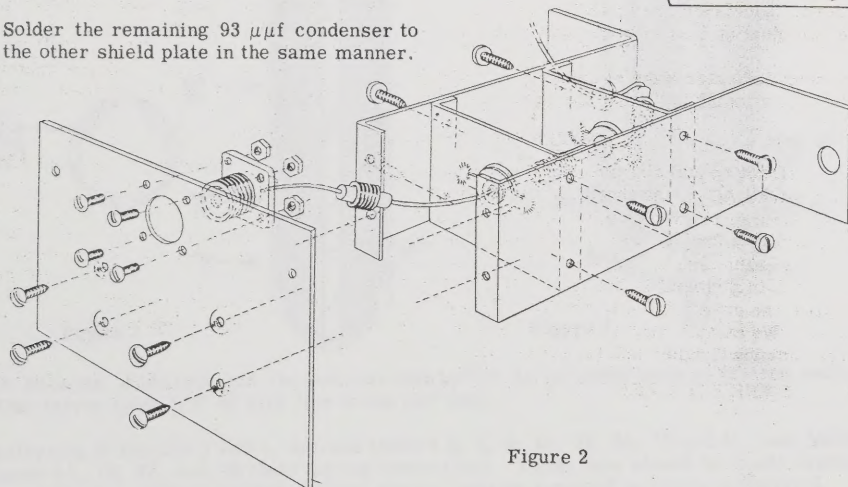
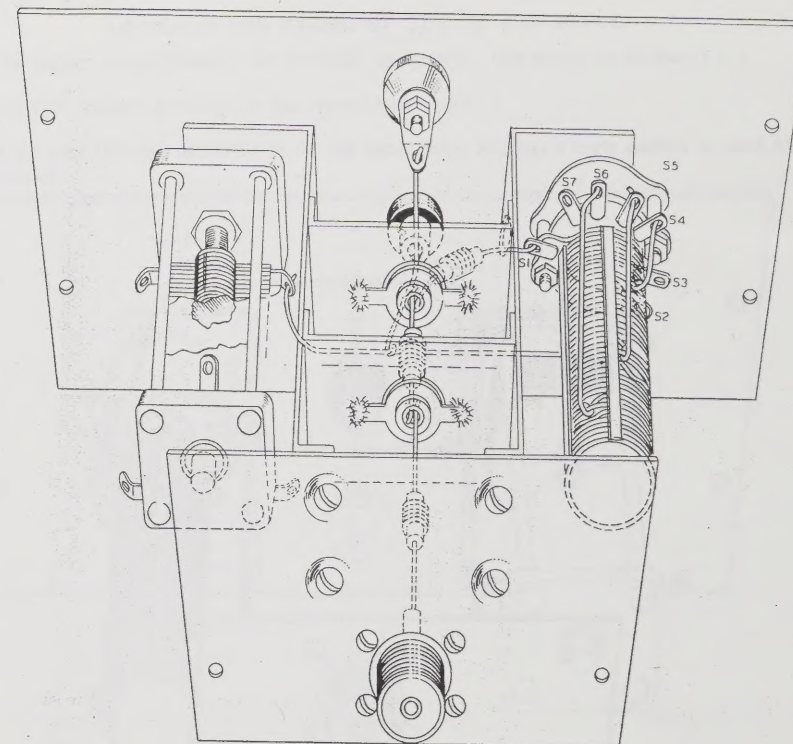


Figure 2

- (X) Assemble the two shield plates to the two panel brackets as shown in Figure 2, using #6 sheet metal screws.
- (X) Note that one panel bracket has a hole on the side.
- (X) Using this hole for reference, mount the back plate to the panel brackets as shown in Figure 2, using #6 sheet metal screws in the recessed holes.
- (X) Mount the coaxial receptacle to the back plate with the flange on the inside of the plate. Use 4-40 screws and nuts.

NOTE: Examine the preadjusted filter units. The two having the least number of turns or wire are used on the end sections of the filter. They are identical and interchangeable. The one having the most turns of wire is used in the center section of the filter. After the coils are mounted any excess leads should be cut off before soldering. The coils may have some of the turns spread apart. This is done in calibration and must not be altered.

- (X) Mount the center section coil between the two shield plates by inserting its leads through the holes in the feed through capacitors (NS). See Pictorial 1.



PICTORIAL 1

- (X) Mount the rear end section coils as shown in Pictorial 1 with one lead connected to the center of the coaxial receptacle (S), and the other lead should be inserted through the hole in the rear feed through condenser (S).
- (X) Mount the front filter coil with one lead inserted through the hole in the front feed through capacitor (S), and the other lead extending through the hole in the side of the panel bracket. Leave this end free.

This completes the assembly and wiring of the low pass filter.

PREPARATION AND MOUNTING OF TUNING INDUCTANCE

Note: This coil must be tapped at four places. In order to do this without shorting turns, the two turns on either side of the tapped turn are depressed to allow clearance for the tap. See Figure 3. The coil is supported from the switch by the heavy tinned wire associated with it. This requires some dexterity in mounting. The coil mounting can be more readily understood from the following figure (Figure 4) than from any description. It is suggested that you carefully study this figure.

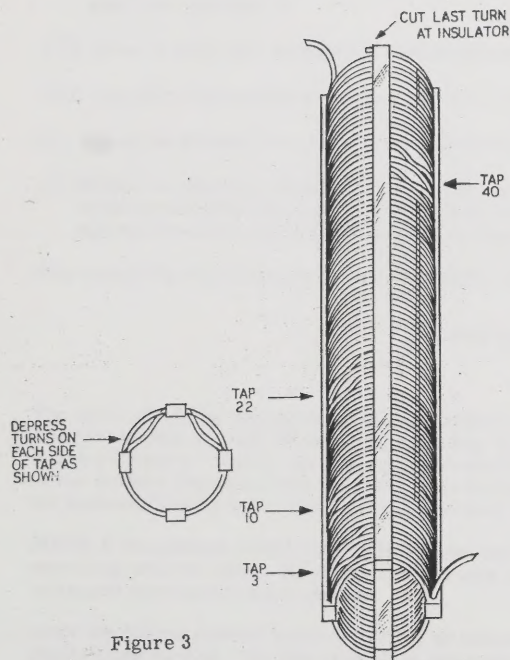


Figure 3

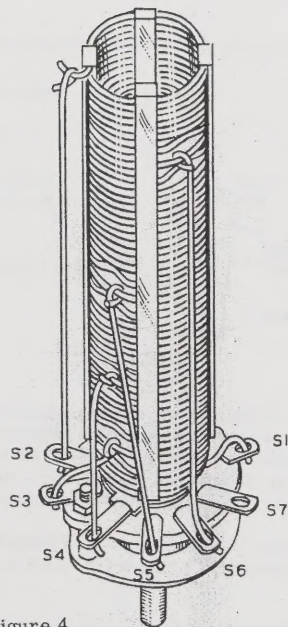


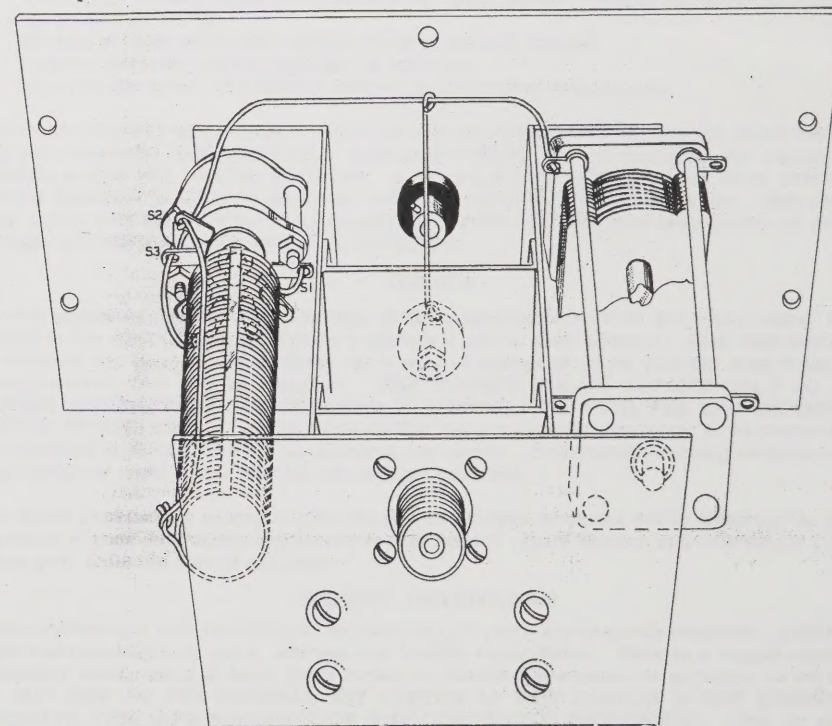
Figure 4

- (X) On each end of the coil, cut the last turn just before the insulator strip at the coil ending. This leaves about 1/2" of wire free at the coil ends.
- (X) Referring to Figures 3 and 4, depress turns # 2, 4, 9, 11, 21, 23, 39 and 41, thus leaving turns # 3, 10, 22, and 40 clear for tap connectings. These taps should be made opposite one of the free ends of the coil, so that the coil may be mounted as shown in Figure 4.
- (X) Connect a heavy tinned wire about 4" long to switch connection S2 (NS). Run wire straight back from the switch. (See Figure 4.)
- (X) Place coil with the tap nearest the end toward the switch.
- (X) See Figure 4 and connect one free coil end to S1. Crimp tightly, but do not solder.
- (X) Connect the other coil end to the heavy wire running from S2 (S).
- (X) Connect a heavy tinned wire from tap 3 (S) to S3 (S).
- (X) Connect a heavy tinned wire from tap 10 (S) to S4 (S).
- (X) Connect a heavy tinned wire from tap 22 (S) to S5 (S).
- (X) Connect a heavy tinned wire from tap 40 (S) to S6 (S).
- (X) S7 is an open contact with no connections.

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ASSEMBLY AND WIRING OF CHASSIS AND PANEL

- (X) Bend the solder connections on the variable condenser. (As shown in Pictorial 1.)
- (X) Insert a 1/2" rubber grommet in the center panel hole.
- (X) Mount the feed through insulator in the top panel hole, placing a cork washer on both sides of the panel.



PICTORIAL 2

- (X) Align the 3/8" chassis holes with the panel holes. The free lead extending through the panel bracket should be toward the left as the panel is viewed from the front.
- (X) Mount the variable condenser through the right side bracket and panel holes, using a lock washer behind the panel and a flat washer and control nut in front.
- (X) Mount the switch assembly through the left bracket and panel holes, in the same manner. Orient the switch so that terminal S1 is adjacent to the free end of the filter lead.
- (X) Connect the free end of the filter lead to S1 (S). Dress the lead to be centered in the hole in the panel bracket.
- (X) Run a heavy tinned wire from S2 (S) below the chassis to the solder lug on the variable condenser (S). See Pictorial 2.

1. The first step in the process of the development of the human brain is the formation of the neural tube.
2. The neural tube is a hollow tube that forms the basis for the brain and spinal cord.
3. The neural tube is formed from the ectoderm, the outermost layer of the embryo.
4. The neural tube is formed from the neural plate, a flat sheet of cells that folds up to form the tube.
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(X) Connect a heavy tinned wire from the solder lug on the feed through insulator to the tinned wire just installed (S).

(X) Insert a neon bulb through the rubber grommet in the panel far enough to contact this wire.

This completes the wiring of the Heathkit AC-1 Antenna Coupler.

(X) Mount the rubber feet on the cabinet as shown in Figure 5.

(X) Mount the Antenna Coupler in the case, using two sheet metal screws through the holes in the back of the case and six metal screws through the holes in the panel.

This completes the construction of the Heathkit AC-1 Antenna Coupler.



Figure 5

OPERATION

The AC-1 should be connected to the transmitter output through a 52 ohm coaxial cable, and an end fed antenna at least 75 feet long including lead-in connected to the output terminal of the Antenna Coupler. Shorter antennas may be used above 3.5 mc. The transmitter should be set on the desired frequency and the final stage tuned for a dip. Now adjust the coarse control on the Antenna Coupler for an indication on the neon lamp or increased transmitter plate current.

NOTE: If the antenna length is such that a current node is present at the Antenna Coupler, the neon lamp will not light. However, the unit may be tuned in the usual manner by adjusting for increased transmitter plate current.

After the coarse control has been set for an indication on the neon lamp, or for increased transmitter plate current, the fine control is adjusted for maximum or peak indication of current. Readjust transmitter plate current for minimum. By using combinations of fine and coarse control settings, random lengths of wire over the minimum specified, may be adjusted for operation on the bands from 80 to 10 meters. With a longer length of wire, or a loading coil inserted in the antenna lead, this coupler may also be used for operation on the 160 meter band.

Caution: Do not use this Antenna Coupler on transmitters having over 75 WATTS OUTPUT from the final amplifier. Higher power transmitters may arc the tuning condenser or damage the low pass filter.

IN CASE OF DIFFICULTY

Due to the simplicity of this kit, about the only possible cause for trouble will be mistakes in wiring or shorted leads. Dress all bare wire to clear the metal of the chassis and panel. Re-check wiring against the pictorials. If the neon lamp fails to indicate on any antenna tried, check to see that the rear contact of the neon bulb is touching the wire between the antenna insulator passing down to the wire connecting between the coil and condenser. If necessary, a small dab of solder may be used to make a permanent connection between the lamp and this wire. Be sure the solder lug on the front of the variable condenser is clear of the panel. A short at this point will cause the antenna coupler to become inoperative. The antenna must be insulated along its entire length from contact to any parts of buildings, trees, etc. It should be kept as far in the clear from all objects as possible for maximum efficiency of operation.

REPLACEMENTS

Material supplied with Heathkits has been carefully selected to meet design requirements and ordinarily will fulfill its function without difficulty. Occasionally improper instrument operation can be traced to a faulty tube or component. Should inspection reveal the necessity for replacement, write to the Heath Company and supply all of the following information:

- Thoroughly identify the part in question by using the part number and description found in the manual parts list.
- Identify the type and model number of kit in which it is used.
- Mention the order number and date of purchase.
- Describe the nature of defect or reason for requesting replacement.

The Heath Company will promptly supply the necessary replacement. Please do not return the original component until specifically requested to do so. Do not dismantle the component in question as this will void the guarantee. If tubes are to be returned, pack them carefully to prevent breakage in shipment as broken tubes are not eligible for replacement. This replacement policy does not cover the free replacement of parts that may have been broken or damaged through carelessness on the part of the kit builder.

SERVICE

In event continued operational difficulties of the completed instrument are experienced, the facilities of the Heath Company Service Department are at your disposal. Your instrument may be returned for inspection and repair for a service charge of \$3.00 plus the cost of any additional material that may be required. THIS SERVICE POLICY APPLIES ONLY TO COMPLETED INSTRUMENTS CONSTRUCTED IN ACCORDANCE WITH THE INSTRUCTIONS AS STATED IN THE MANUAL. Instruments that are not entirely completed or instruments that are modified in design will not be accepted for repair. Instruments showing evidence of acid core solder or paste fluxes will be returned not repaired.

The Heath Company is willing to offer its full cooperation to assist you in obtaining the proper operation of your instrument and therefore this factory repair service is available for a period of one year from the date of purchase.

SHIPPING INSTRUCTIONS

Before returning a unit for service, be sure that all parts are securely mounted. Attach a tag to the instrument giving name, address and trouble experienced. Pack in a rugged container, preferably wood, using at least three inches of shredded newspaper or excelsior on all sides. DO NOT SHIP IN THE ORIGINAL KIT CARTON AS THIS CARTON IS NOT CONSIDERED ADEQUATE FOR SAFE SHIPMENT OF THE COMPLETED INSTRUMENT. Ship by prepaid express if possible. Return shipment will be made by express collect. Note that a carrier cannot be held liable for damage in transit if packing, in HIS OPINION, is insufficient.

SPECIFICATIONS

All prices are subject to change without notice. The Heath Company reserves the right to discontinue instruments and to change specifications at any time without incurring any obligation to incorporate new features in instruments previously sold.

WARRANTY

The Heath Company limits its warranty of parts supplied with any kit (except tubes, meters and rectifiers, where the original manufacturer's guarantee only applies) to a period of three (3) months from the date of purchase. Replacement will be made only when said part is returned postpaid, with prior permission and in the judgment of the Heath Company was defective at the time of sale. This warranty does not extend to any Heathkits which have been subjected to mis-



use, neglect, accident and improper installation or applications. Material supplied with a kit shall not be considered as defective, even though not in exact accordance with specifications, if it substantially fulfills performance requirements. This warranty is not transferable and applies only to the original purchases. This warranty is in lieu of all other warranties and the Heath Company neither assumes nor authorizes any other person to assume for them any other liability in connection with the sale of Heathkits.

The assembler is urged to follow the instructions exactly as provided. The Heath Company assumes no responsibility or liability for any damages or injuries sustained in the assembly of the device or in the operation of the completed instrument.

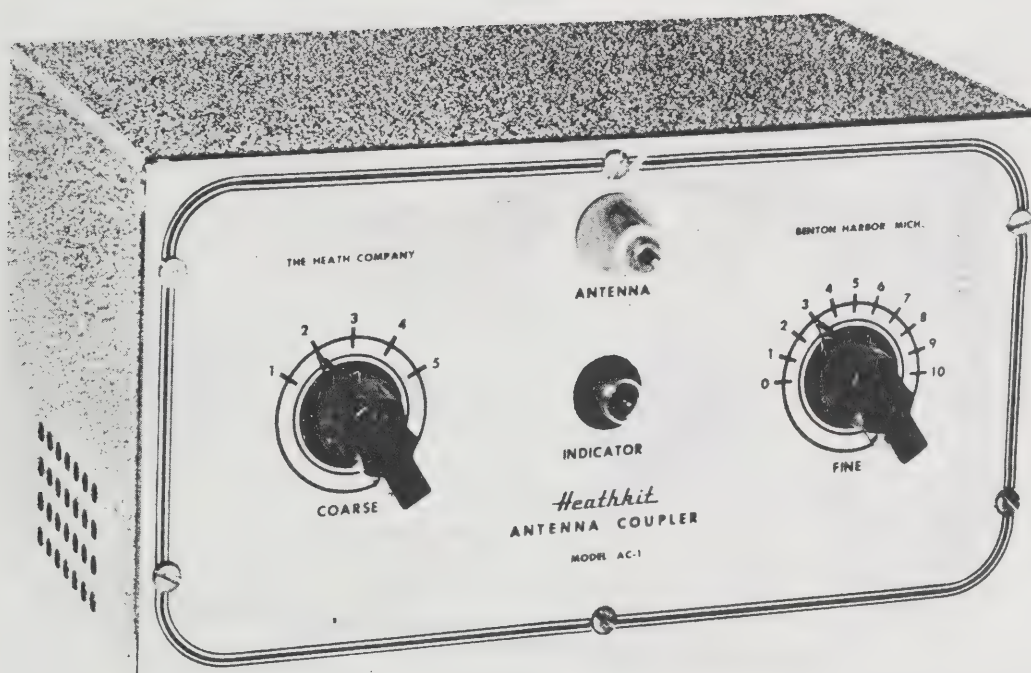
HEATH COMPANY
Benton Harbor, Michigan

PARTS LIST

PART No.	PARTS Per Kit	DESCRIPTION	PART No.	PARTS Per Kit	DESCRIPTION
Condensers			Cabinet-Panel-Chassis		
20-37	2	93 μf	90-10	1	Cabinet
26-18	1	250 μf variable	203-M55F68	1	Panel
Switches-Coils			204-M54	1	Right panel bracket
63-71	1	1 pole 5 pos. rotary	204-M55	1	Left panel bracket
40-48	1	Miniductor	205-M24	2	Shield plate
40-49	2	.18 μh filter	205-M25	1	Back plate
40-50	1	.42 μh filter	Miscellaneous		
Lamps-Grommets-Feet			71-2	1	Insulator
73-3	1	1/2" rubber grommet	340-3	1	length #16 bare wire
261-1	4	Rubber feet	595-75	1	Manual
412-3	1	NE51 neon lamp			
Knobs-Jacks					
436-5	1	Coaxial jack			
438-9	1	Coaxial plug			
462-M11	2	Pointer knob			
Hardware					
250-4	4	4-40 x 3/8 screw			
250-8	20	#6 x 3/8 sheet metal screw			
250-22	2	Set screw			
252-2	4	4-40 nut			
252-7	2	Control nut			
253-10	2	Control flat washer			
254-4	2	Control lockwasher			

HEATHKIT ANTENNA COUPLER

MODEL AC-1

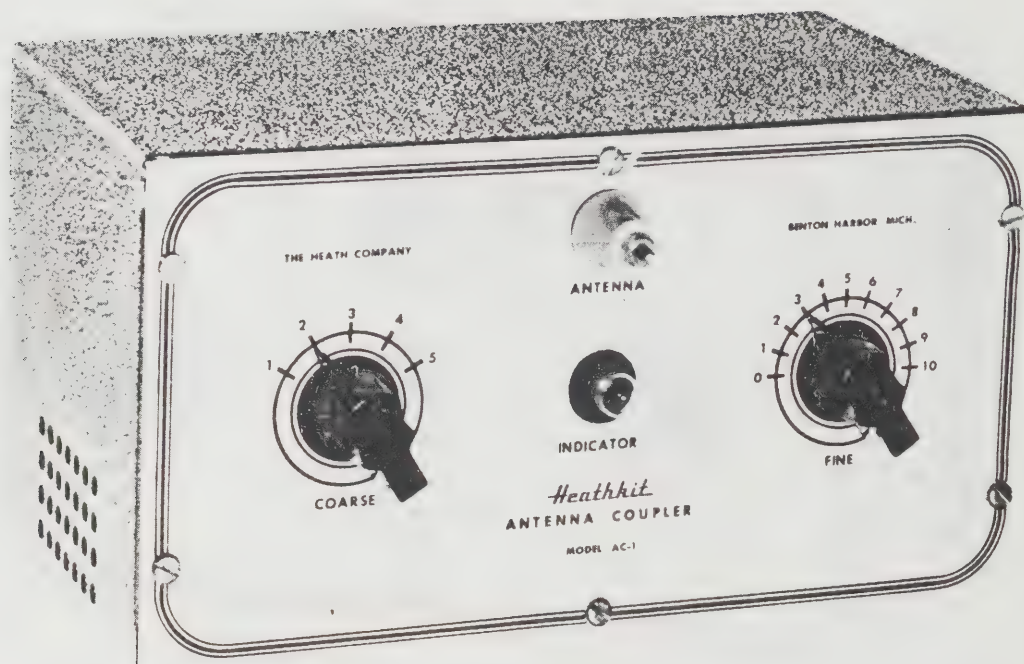


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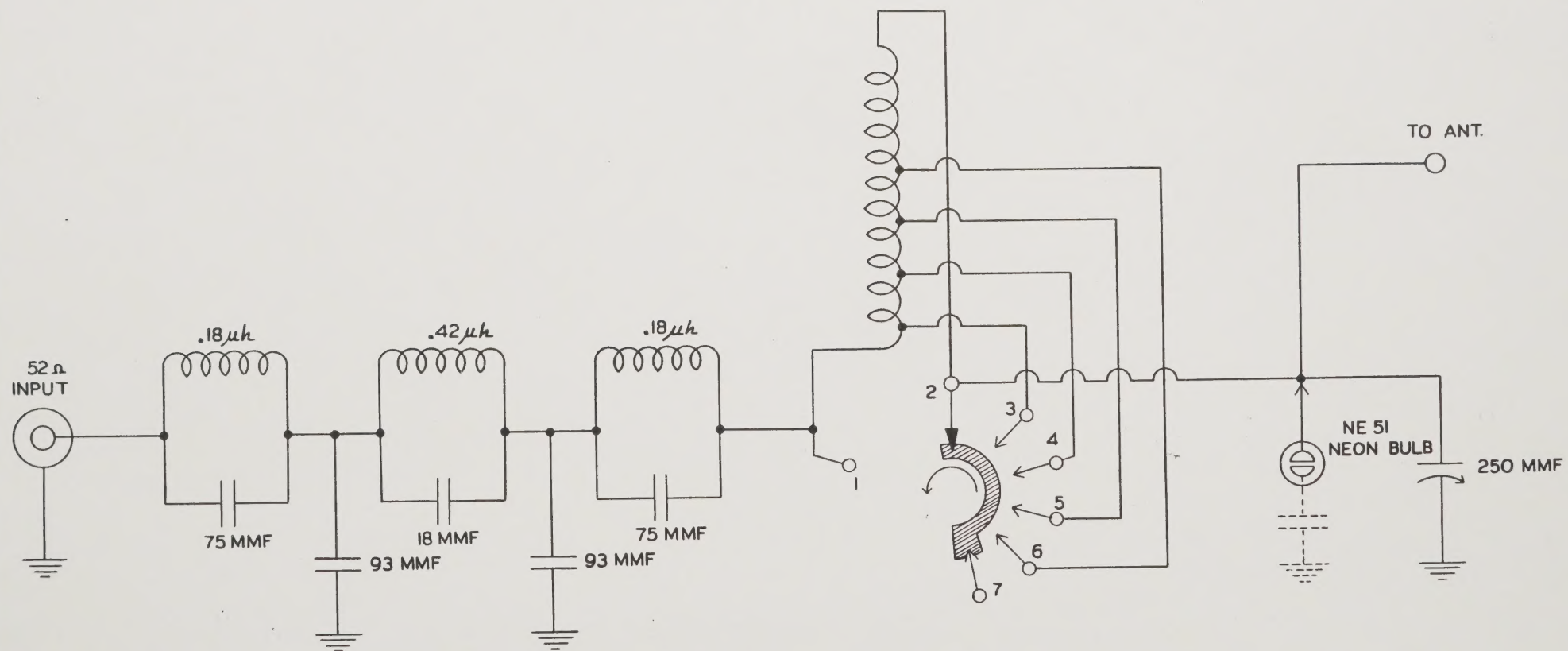
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